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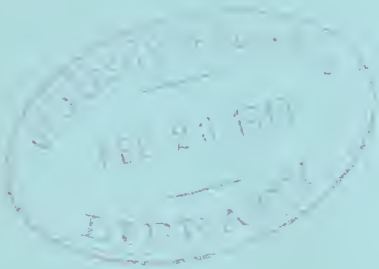

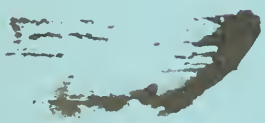

MENTAL ABILITY IN RELATION TO HEAD CIRCUMFERENCE, CEPHALIC INDEX, SOCIOLOGICAL CONDITION, SEX, AGE, AND NATIONALITY.

By Arthur Mac Donald, *Author of "Man and Abnormal Man,"* * *Washington, D. C.*

In 1897, the writer conducted a study of the Washington school children, which was one of the first investigations of this kind in the United States. One of the measurements taken was circumference of head on the plane of the eyebrows, which is a measurement seldom, if ever, made on large numbers of children. Data were also gathered as to the ability of the children in different branches of study, which was the first time such an inquiry had been conducted on a large scale.

At that time the results were published in a voluminous work, not only containing other measurements, but treating of other subjects. As a consequence these results are not easy of access. The purpose of this article, therefore, is to call special attention to these and other points suggested.

As the difficulties of estimating the mental ability of pupils are well known, and as there is always doubt as to whether a teacher's judgment was correct, all possible precautions were taken. For instance, if there was the least doubt in the teacher's mind as to whether a pupil was bright or dull, the teacher was told to mark such pupil average, so that there might be as few errors as possible as to brightness and dullness.

Teachers were asked to report only on pupils whom they knew well, and while the test rested mainly on their records, yet this did not prevent them from giving weight to their opinion, where the records were inadequate. Though there are no satisfactory standards of ability, this does not in the least prevent us from saying that one pupil is bright and another dull.

* This public document (780 pages) might be obtained gratis, either through any United States Senator or Representative, or by writing directly to the Superintendent of the House or of the Senate Document Room. Also the "Superintendent of Documents," at the Government Printing Office, Washington, D. C., will send this document on receiving its price (40 cents).

The pupils were divided according to the occupation of their parents into (1) laboring and (2) non-laboring classes. The non-laboring comprise professional and mercantile people; the laboring embrace all others including skilled and unskilled laborers.

TABLE I.

MENTAL ABILITY AND CIRCUMFERENCE OF HEAD.

Nearest Age.	Bright Boys.		Dull Boys.		Average Boys.		Bright Girls.	
	Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.
6.....	53	20.25	39	20.29	45	20.26	5	21.27
7.....	205	20.50	99	20.29	199	20.35	236	20.02
8.....	320	20.57	101	20.29	326	20.54	364	20.20
9.....	384	20.65	102	20.48	340	20.64	403	20.33
10.....	392	20.78	118	20.53	355	20.74	404	20.50
11.....	322	20.83	97	20.59	386	20.85	388	20.59
12.....	349	20.98	128	20.85	459	20.93	328	20.93
13.....	305	21.06	131	21.01	421	20.98	338	21.03
14.....	227	21.26	143	21.07	371	21.24	285	21.29
15.....	167	21.61	116	21.32	220	21.41	204	21.34
16.....	104	21.78	80	21.55	144	21.67	142	21.50
17.....	34	22.08	32	21.56	70	22.00	45	21.76
18.....	14	22.12	4	22.03	24	21.95	45	21.70

TABLE I.—*Continued.*

Dull Girls.		Average Girls.		Bright Boys American Parents: Laboring Classes.		Dull Boys American Parents: Laboring Classes.	
Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.	Number.	Average Circumference of Head in Inches.
40	19.61	49	20.03	11	20.04	..	.....
41	19.72	231	19.89	58	20.42	45	20.28
68	19.92	322	20.11	112	20.50	50	20.29
62	20.30	418	20.25	119	20.65	54	20.43
62	20.23	473	20.41	141	20.71	48	20.57
86	20.36	457	20.53	100	20.72	44	20.64
82	20.48	465	20.74	112	20.93	49	20.75
113	20.77	515	20.93	88	21.03	58	20.91
101	20.93	447	21.18	57	21.15	44	20.96
112	21.38	339	21.26	39	21.50	40	21.21
55	21.24	253	21.34	21	21.93	32	21.54
60	21.40	165	21.57	..	.....	..	.....
25	21.54	109	21.58	..	.....	..	.....

In order that the measurements might be made as accurate as possible, the superintendent of the schools selected the

most careful teachers and the writer spent much time in instructing and directing them in the work. All of the head measurements except circumference, were made by the writer himself.

In Table I is given the average circumference of head (in inches) of bright, dull, and average boys and girls. As will be seen, the average circumference of head of bright boys is greater for every age (except 6) than that of the dull boys. The bright girls also show, for every age, a larger average circumference of head than the dull girls.

But we do not know whether or not this difference in head circumference between bright and dull children may not be due to racial and sociological conditions. In the last four columns of Table I these two factors are eliminated, where bright boys of American parentage and belonging to the laboring classes are compared with dull boys of similar parentage and same sociological conditions. Here, also, for every age the average head circumference of the bright boys is greater than that of the dull boys. This is the first time by actual measurements on large numbers that mental brightness has been shown to be accompanied with a larger circumference of head than mental dullness.*

TABLE II.

ABILITY AND CEPHALIC INDEX.

Divisions According to Social Classes and Ability.	Number of Individuals.	Average Age in Years and Months.		Long-headed (Dolicocephalic).	Medium-headed (Mesocephalic).	Short-headed (Brachycephalic).
		Years.	Months.	Per Cent.	Per Cent.	Per Cent.
Non-laboring classes.						
Bright boys	117	12	..	9	57	34
Bright girls	114	13	1	13	53	34
Dull boys	39	14	1	28	44	28
Dull girls	39	15	4	8	46	46
Average boys	49	12	6	12	43	45
Average girls	30	14	10	10	48	42
Laboring classes.						
Bright boys	53	12	..	8	32	60
Bright girls	62	13	2	14	60	26
Dull boys	34	12	7	6	38	56
Dull girls	34	13	9	12	44	44
Average boys	32	11	1	13	53	34
Average girls	37	13	7	11	43	46
Not socially divided.						
Bright boys	55	13	10	9	58	33
Bright girls	83	12	2	8	44	48

* It might be stated that Doctor Porter in his investigation of St. Louis school children in 1893, found a larger width of head in successful school children.

Table II gives the figures for mental ability and cephalic index. Eliminating the sociological element, 9 per cent. of the bright boys and 28 per cent. of the dull boys of the non-laboring classes are long-headed, while in the same sociological class 34 per cent. of bright and 28 per cent. of dull boys are brachycephalic. The reverse is true in case of the girls in this class; that is, 13 per cent. of the bright and 8 per cent. of the dull girls are dolicocephalic, and 34 per cent. of the bright and 46 per cent. of the dull are brachycephalic. That is to say, in boys dolicocephaly seems to indicate a higher per cent. of dullness and brachycephaly a higher per cent. of brightness, while in girls the opposite is true. With the laboring classes the same comparisons are true except in the case of the brachycephalic boys. In connection with the fact, that dull boys show a much larger per cent. of dolicocephaly than bright boys, it may be stated that colored boys as compared with white boys are much more dolicocephalic. Also dull colored boys have 40 and bright colored boys 23 per cent. of dolicocephaly (See "Man and Abnormal Man").

Comparative Ability in Studies.

The teachers were asked not only to mark each pupil bright, dull, or average in general, but to specify the studies in which each one was bright, dull, or average, so that their estimate of ability might be as complete as possible. As it is easier to determine the status of a pupil in some single branch, than in general, the results in the following table may be not only more definite, but less liable to error.

In Table III are given the numbers and percentages of ability of pupils in the main branches of study. Some of the teachers reported for "arithmetic" under head of "mathematics." These results were not consolidated, since any agreement between them would tend to confirm the general correctness of the reports.

Ability and Sex.

By analysis of the table (III), we find that boys of American parents when compared with girls of American parents are inferior to the girls in algebra, drawing, history, language,

manual labor, music, penmanship, reading and spelling, and superior to the girls in arithmetic and mathematics; that is, the boys are inferior in eight studies, superior in two and equal in four.

If we now compare the boys of American parentage, non-laboring classes, with the girls of like parentage and class, eliminating the influence of nationality and sociological conditions, we find that the girls excel the boys still more, being equal to them in arithmetic, where before they were inferior and superior in geography where they were formerly equal to them.

Comparing boys and girls of the laboring classes, American parentage, the boys gain some, for they are superior in history, where they were equal to the girls. They are equal in drawing, where they were inferior to the girls.

TABLE III.

	Mental Divisions.	Algebra.		Arithmetic.		Drawing.		Geography.		History.	
		Number.	%	Number.	%	Number.	%	Number.	%	Number.	%
Boys of American parentage	Bright...	38	36	2,170	44	498	34	387	35	306	44
	Dull.....	20	19	912	18	327	22	143	13	134	15
	Average..	48	45	1,862	38	634	44	572	52	370	41
Girls of American parentage	Bright...	90	49	1,820	37	576	35	453	36	491	41
	Dull.....	21	11	931	19	268	17	150	12	181	15
	Average..	73	40	2,186	44	789	48	641	52	519	44
Boys of American parentage (non-laboring classes)	Bright...	31	37	1,170	46	341	39	278	42	295	51
	Dull.....	15	18	477	19	192	22	69	10	60	10
	Average..	38	45	904	35	347	39	321	48	226	39
Girls of American parentage (non-laboring classes)	Bright...	61	50	966	42	358	41	288	46	344	50
	Dull.....	12	10	278	12	109	13	26	4	54	8
	Average..	48	40	1,037	46	402	46	311	50	287	42
Boys of American parentage (laboring classes)	Bright...	7	32	1,000	42	157	27	109	25	101	32
	Dull.....	5	23	435	18	135	23	74	17	74	23
	Average..	10	45	958	40	287	50	251	58	144	45
Girls of American parentage (laboring classes)	Bright...	29	46	854	32	218	28	165	27	147	29
	Dull.....	9	14	653	25	159	21	124	20	127	25
	Average..	25	40	1,149	43	387	51	330	53	232	46
Boys of foreign and mixed nationalities	Bright...	12	50	684	41	141	31	102	30	98	35
	Dull.....	1	4	311	19	111	24	51	15	58	21
	Average..	11	46	665	40	202	45	189	55	123	44
Girls of foreign and mixed nationalities	Bright...	20	27	563	34	182	33	120	30	138	30
	Dull.....	22	30	402	24	98	17	69	18	95	21
	Average..	31	43	685	42	278	50	204	52	222	49
Colored boys	Bright...	30	61	1,033	54	153	47	212	45	141	51
	Dull.....	4	8	386	20	55	17	62	13	30	11
	Average..	15	31	501	36	119	36	201	42	104	38
Colored Girls	Bright...	37	65	948	60	73	40	250	62	159	64
	Dull.....	11	19	459	29	46	25	100	25	56	22
	Average..	9	16	173	11	65	35	52	13	35	14

TABLE III.—*Continued.*

Language and English.		Manual Labor. Sewing.		Mathematics.		Music.		Penmanship.		Reading.		Science. Botany.		Spelling.	
Number.	%	Number.	%	Number.	%	Number.	%	Number.	%	Number.	%	Number.	%	Number.	%
1,322	38	661	29	155	50	337	24	449	28	1,079	43	106	44	398	33
675	19	475	21	48	16	286	29	424	27	509	21	44	12	297	24
1,493	43	1,113	50	103	34	475	47	722	45	900	36	167	44	526	43
1,705	46	860	40	141	34	416	40	658	40	1,287	54	197	45	630	48
392	10	198	9	84	20	101	10	223	13	265	11	63	15	181	14
1,618	44	1,117	51	188	46	515	50	767	47	846	35	175	40	488	38
805	42	371	31	116	56	156	25	254	30	595	48	114	48	252	35
316	17	235	19	23	11	187	29	227	27	204	17	22	9	166	23
787	41	600	50	69	33	294	46	370	43	427	35	100	43	295	42
1,002	53	488	45	97	36	265	45	359	45	684	64	128	50	372	58
89	5	52	5	50	18	47	8	89	11	47	4	36	14	55	8
791	42	545	50	123	46	275	47	358	44	338	32	90	36	219	34
527	33	290	28	39	40	81	23	195	26	484	38	52	37	146	29
359	23	240	23	25	25	99	27	197	27	305	24	22	16	131	26
706	44	513	49	34	35	181	50	352	47	473	38	67	47	231	45
703	38	372	34	44	31	151	34	299	35	603	45	69	38	258	40
303	17	146	13	34	24	54	12	134	16	218	17	27	15	126	19
827	45	572	53	65	45	240	54	409	49	508	38	85	47	269	41
392	32	221	27	45	43	74	25	123	26	316	40	51	37	121	31
260	22	183	23	16	15	71	25	128	28	162	21	20	15	109	27
561	46	400	50	44	42	144	50	216	46	306	39	65	48	165	42
476	38	263	36	47	34	148	42	228	44	373	46	69	38	192	41
217	18	79	11	35	25	34	10	59	13	119	15	28	16	76	16
548	44	379	53	58	41	166	48	221	43	375	39	84	46	197	43
448	42	.....	..	28	44	85	36	346	45	795	49	7	25	348	41
180	17	.....	..	20	31	45	19	135	17	361	22	12	43	189	23
429	41	.....	..	16	25	106	45	299	38	478	29	9	32	300	36
568	63	.....	..	....	..	82	49	367	54	928	17	17	31	416	59
201	22	.....	..	....	..	23	14	134	19	294	21	6	11	164	23
140	15	.....	..	....	..	62	37	184	27	157	62	32	58	128	18

Comparing boys and girls of mixed nationalities, the boys become superior in algebra, where they were inferior. Whatever sociological or racial division is made, the girls generally excel the boys in mental ability, as estimated by the teachers. But at the same time, the girls show higher percentage of average ability and therefore less variability. Thus boys are inferior in average ability to girls in nine studies, equal in one and superior in four. From the evolutionary point of view, the boys might be considered superior to the girls, since the superior species varies the most.

It is true that girls are usually more industrious than boys and therefore more successful in school. It is also true that those having the highest marks are usually the brightest. But there are pupils who gain high marks by faithfulness rather than by brightness. In such instances, the teacher usually marked them average.

Ability and Sociological Conditions.

If we compare boys of American parents and non-laboring class with boys of like parentage but of laboring class, the former are equal in five studies, superior in nine and inferior in none to the latter. Sociological conditions affect the girls still more, since those of American parentage, non-laboring class, excel the girls of like parentage, but of laboring class, in all branches of study. The children of the laboring classes excel those of the non-laboring classes in average ability or mediocrity. Comparing boys of the non-laboring class with boys of the laboring class, the former are inferior to the latter in average ability, in eleven studies, superior in one and equal in two. The girls of the non-laboring class are inferior in average ability to the girls of the laboring class in ten studies, superior in two and equal in one study.

This mental superiority of the non-laboring, or professional and mercantile classes is confirmed by other results gained from the study of the Washington schools. It was shown that the bright are taller and heavier than the dull thus verifying studies in other cities, and also that the children of the professional and mercantile classes are taller and heavier than the children of the laboring classes.

Ability and Nationality.

From examination of Table III, it will be seen that boys of foreign and mixed nationalities are inferior to the boys of American parentage in five studies, equal in eight and superior in one, and that the girls of foreign and mixed nationality are inferior to the girls of American parentage in nine studies, equal in five and superior in none. Thus the influence of foreign and mixed nationality seems unfavorable to the development of ability.

Boys of foreign and mixed nationalities are inferior in average ability in one study; superior in eleven studies and equal in two studies to boys of American parentage. So, also, girls of foreign and mixed nationality are inferior in average ability in four studies, superior in eight and equal in two studies to girls of American parentage. In other words, children of foreign and mixed nationalities excel children of American parentage in average ability or mediocrity.

TABLE IV.

BOYS—AMERICAN PARENTAGE.

Nearest Age.	Mental Divisions.	Algebra.	Arithmetic.	Drawing.	Geography.	History.	Language and English.	Manual Labor. Sewing.	Music.	Penmanship.	Reading.	Science. Botany.	Spelling.
Years.													
7	Bright	..	48	27	..	..	45	30	25	22	48	56	46
	Dull	..	16	35	..	..	18	26	36	38	25	6	12
	Average	..	36	38	..	..	37	44	40	40	27	38	42
8	Bright	..	47	31	69	..	39	31	35	33	50	51	37
	Dull	..	14	15	8	..	15	23	17	25	17	15	20
	Average	..	39	54	23	..	46	46	48	42	33	34	43
9	Bright	..	48	33	..	..	48	28	37	34	49	53	45
	Dull	..	15	21	..	..	14	20	18	20	13	9	12
	Average	..	37	46	..	..	38	52	45	46	38	38	43
10	Bright	..	51	25	54	48	29	26	27	27	51	37	37
	Dull	..	11	28	5	..	15	19	23	27	21	12	24
	Average	..	38	47	41	..	37	52	51	46	28	51	39
11	Bright	..	45	31	48	56	41	27	23	29	46	35	32
	Dull	..	17	19	10	11	16	26	22	23	20	13	21
	Average	..	38	50	42	33	43	47	55	48	34	52	47
12	Bright	..	44	35	36	54	37	28	20	23	39	47	30
	Dull	..	17	24	11	11	17	20	33	29	22	11	25
	Average	..	39	41	53	35	46	52	47	48	39	42	45
13	Bright	..	42	37	29	45	32	22	21	29	29	44	26
	Dull	..	20	16	12	8	25	23	33	27	21	17	24
	Average	..	38	47	59	47	43	55	46	44	50	39	50
14	Bright	42	38	35	27	41	29	27	7	22	22	25	26
	Dull	11	24	26	17	18	24	21	44	31	22	12	33
	Average	47	38	39	56	41	47	52	49	47	56	63	41
15	Bright	43	29	51	19	42	29	40	20	27	23	30	19
	Dull	18	42	23	24	17	29	15	42	27	42	10	48
	Average	39	29	26	57	41	42	45	38	46	35	60	33
16	Bright	35	24	52	19	28	27	41	11	27	10	..	29
	Dull	24	32	25	26	30	28	17	47	22	48	..	33
	Average	41	44	23	55	42	45	42	42	51	42	..	38
17	Bright	11	24	43	14	26	12	43	..	..	..	..	60
	Dull	22	14	14	14	18	24	14	..	..	..	..	20
	Average	67	62	43	72	56	64	43	..	..	..	..	20

Age and Ability.

In Table IV are given the percentages of ability in different studies computed on number reported.

From this table it will be seen that as boys increase in age, the percentage of brightness decreases in all the studies, except drawing, manual labor and penmanship; that is, in the more mechanical studies. On the other hand, dullness increases with age in boys in all the studies, except drawing, manual labor, penmanship, music and science. These propositions are generally true of the girls as shown by a similar table, published in "Man and Abnormal Man."

Also as age increases the percentage of average ability or mediocrity increases in different studies, with the exception of spelling.